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Kitchen science: What 'molecular cuisine' has taught us

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BBC Food



The term "molecular gastronomy" has become unpopular with some chefs, after it was coined about 20 years ago. Which of its culinary influences are likely to stand the test of time?

"I think the whole point of what's been happening is there has been a minor revolution in the way in which restaurants work," says physicist Professor Peter Barham from the University of Bristol, speaking about the thrills and potential hazards of molecular cuisine at the Bristol Food Connections festival.

Take liquid nitrogen. The instant freezing technique came to prominence through pioneering chef Heston Blumenthal's use in the Fat Duck restaurant in Berkshire, about 10 years ago.

It has since been adopted by high end cocktail bars, restaurants and is regularly featured in TV cooking shows.

Molecular cuisine at home



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"Now you can hardly walk into a Michelin starred restaurant without seeing it... it's gone mad," says Prof Barham, who has been credited with introducing Mr Blumenthal to many scientific techniques.

Terms like "molecular cuisine" and "molecular gastronomy" are more popular with the media than the restaurant industry.

"Molecular gastronomy" is usually used to describe the study of how food changes when it cooks. But it has been rejected by the likes of Heston Blumenthal who, with other chefs, published a statement declaring it as a "fashionable term" that "does not describe our cooking, or indeed any style of cooking".

But whatever you call it, scientifically advanced cooking has enabled chefs to present plates that are fun, surprising and theatrical, and create better flavours.



Mango discs made with dehydrated mango puree, micro rocket, goat's cheese and caramelised red onion

The most delicate tastes can now be preserved using a little science. The subtle aroma of rose petals for example can be extracted by vacuum distillation.

The technique, used in chemistry labs before kitchens, boils liquid at a lower temperature using a low pressure, stopping flavour molecules being destroyed by heat.

"You might crush up some rose petals, gently put them in some water and then extract by vacuum instillation that aroma and then add it at the very, very last minute back into your dish," explains Prof Barham.

Freeze drying is one of the latest methods used in experimental restaurants, maximising flavour and texture in each bite.

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Food is frozen without it shrinking. So a strawberry keeps its plump shape. The texture is crunchy and powdery, but as soon as you put it in your mouth, the water releases a "very powerful strawberry flavour", says Prof Barham.

The theatrical element of molecular cuisine is particularly appealing to some.

Caterers Bubble, based in London, now incorporate "molecular" techniques in most of their menu.

"[Molecular gastronomy] has allowed us to push the boundaries of event catering and offer a real 'wow factor' for our clients," says managing director Michael Collins.

"We have found that molecular cuisine is particularly well-suited to events and that the more unusual items are a fantastic talking point for guests and often help break the ice."

On the menu are show pieces such as a starter called "instant smoked artichoke festival", made of different textures of artichoke and accompanied by micro salad and parmesan dusted with 24 carat gold, placed in a "Saturn bowl" filled with hickory smoke from a smoke gun.

How safe is home sous-viding?



Professor Peter Barham:

"There is a finite risk if you don't know what you're doing.

"If you are at home and you're slightly careless and you do anything really foolish, which somebody sometime is going to do - then you could pack up your piece of meat - having got some anaerobe bacteria on your hands - use your bare hands to handle the meat rather than gloves... put it in the vac pack bag, bung it in the water bath, perhaps not cook it for long enough or high enough temperatures, and end up with a very nasty piece of food poisoning. That worries me."

Alex Shannon, Sous Vide Tools:

"Sous-vide is a perfectly safe way of cooking, but a piece of meat that is handled badly would be a bad piece of meat whatever the cooking method. Basic principles of hygiene should always be applied including washing of hands before handling raw meat.

"Although sous-vide is classed as a molecular cuisine technique the method is very simple and just as with traditional cooking the importance is in the time and temperature."

"Mango discs" are made after mango puree inside thin wafers are put in a dehydrator for 72 hours, to create a unique texture. "They must be prepared shortly before consumption or the mango will rehydrate and the canapé will fall apart," explains Mr Collins.

But some chefs think molecular cuisine is less of a revolution and more of a "fad".

Chef Alex Gauthier, of Gauthier Soho restaurant in London, says molecular cooking "is a little bit out of fashion", adding his menu hasn't been influenced by the style.

"There are probably only a handful of chefs in the world who ever did this really well."

For Mr Gauthier, molecular cuisine falls into "gimmicks and trends", which history tells us "are short-lived".

Some molecular cooking techniques - such as vacuum instillation and centrifuges (machines that create a large force by spinning very fast, and can be useful for clarifying sauces) - require expense, specialist kit and are only used in a handful of restaurants.

But molecular cuisine has also helped experts discover the ideal temperatures at which our favourite foods - [the best cheese toastie of your life](#) for example - are cooked to mouth-watering perfection.

Sous-vide food (which uses airtight plastic bags placed in water to cook slowly) is one of the results of the obsession with finding the perfect temperature to cook the most tender dishes.

The water bath technique may once have been sniffed at by chefs regarding it as "cheating cooking", suggests Peter Barham, but now it is used in many kitchens and makes frequent appearance on TV shows such as MasterChef.

Sous-vide cookers for home cooks are even being sold at mainstream stores and online. Equipment supplier Sous Vide Tools has seen a 300% increase in sales of sous-vide machines to the home user.

"Our Polyscience smoking gun is also very popular, allowing customers to cold smoke anything from meat to cheese and even cocktails," says managing director Alex Shannon.

Prof Barham compares the experimental way of cooking with the introduction of nouvelle cuisine about 40 years ago (a style of fresh, light food presented in a more delicate way than before).

"Now when you go to a restaurant you expect... to be surprised, you expect to be laughing some of the time... and that's part of I think the fun of eating out. I think it's changing it."

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